

WHAT IS CLAIMED IS:

1. A communication system comprising:
 - a plurality of relay devices each of which has a relay memory and modifies packets sent from mobile terminals linked to said each relay device on the basis of content stored in said relay memory; and
 - a management device having a management memory,wherein each of said plurality of relay devices comprises:
 - first means for acquiring and storing in said relay memory, address binding information indicating correspondence between a static communication address uniquely pre-assigned to a mobile terminal linked to said relay device and a dynamic communication address assigned to said mobile terminal while located in a communication area covered by said relay device;
 - second means for sending to said management device, destination terminal information indicating a destination address of a packet sent from said mobile terminal, receiving destination terminal information replied from said management device, and storing as address binding information of a communication partner of said mobile terminal, in association with said address binding information, address binding information indicating correspondence between said destination address and a dynamic communication address indicated by said received destination terminal information;
 - third means, when said mobile terminal terminates communication, for releasing in said relay memory a memory area storing said address binding information of said mobile terminal and a memory area storing said address binding information of said communication partner associated with said address binding information of said mobile terminal, and requesting said management device to delete said address binding information of said mobile terminal; and
 - fourth means, when requested by said management device to delete address binding information of another mobile terminal which is linked to another relay device and terminates communication, for releasing in said relay memory a

memory area storing said address binding information of said another mobile terminal associated with said address binding information of said mobile terminal, said management device comprises:

fifth means, in a network having a plurality of relay devices each of which is linked to mobile terminals, for storing in the management memory, address binding information indicating correspondence between static communication addresses assigned to said mobile terminals and dynamic communication addresses assigned to said mobile terminals, and communication status information indicating communication partners of said mobile terminals;

sixth means, when receiving from a relay device, destination terminal information of a packet sent from a mobile terminal linked to said relay device, for reading from said management memory, a dynamic communication address corresponding to a destination address indicated by said destination terminal information, and sending to said relay device, destination terminal information indicating said dynamic communication address; and

seventh means, when requested by a relay device to delete address binding information of a mobile terminal which terminates communication, for identifying a communication partner of said mobile terminal on the basis of communication status information of said mobile terminal stored in said management memory, for identifying a relay device linked to said communication partner on the basis of address binding information of said communication partner stored in said management memory, for requesting said relay device to delete said address binding information of said communication terminating mobile terminal, and for releasing in said management memory a memory area storing said address binding information of said communication terminating mobile terminal and a memory area for storing said communication status information of said communication terminating mobile terminal.

2. A communication system according to Claim 1, wherein:

said first means, when requested to initiate communication by said mobile terminal located in a communication area covered by said relay device,

acquires said dynamic communication address of said mobile terminal; links said relay device with said mobile terminal by permitting said mobile terminal to initiate communication; stores in said relay memory, said address binding information of said mobile terminal indicating correspondence between said static communication address and said dynamic communication address; and sends said address binding information to said management device;

said fifth means, when receiving said address binding information of said mobile terminals from said plurality of relay devices, stores in said management memory, said address binding information in accordance with identification information specifying said plurality of relay devices which have sent said address binding information; and

said sixth means, when receiving said destination terminal information from said relay device, stores in said management memory, communication status information indicating that a mobile terminal, to which is assigned said destination address indicated by said destination terminal information, and said packet sending mobile terminal are communicating with each other.

3. A communication system according to Claim 1, wherein:

said sixth means, when said management memory does not store said dynamic communication address corresponding to said destination address indicated by said destination terminal information, identifies a relay device that can be linked to a mobile terminal to which said destination address is assigned; requests said relay device to acquire said dynamic communication address corresponding to said destination address of said mobile terminal; and stores in said management memory, in accordance with identification information specifying said relay device, address binding information indicating correspondence between said destination address and said dynamic communication address sent from said mobile terminal; and

said relay device further comprises eighth means, when requested by said management device to acquire a dynamic communication address

corresponding to a destination address indicated by destination terminal information, for requesting a mobile terminal to initiate communication to which said destination address is assigned; linking said relay device with said mobile terminal by acquiring a dynamic communication address of said mobile terminal; storing in said relay memory, address binding information indicating correspondence between said destination address and said dynamic communication address of said mobile terminal; and sending said address binding information to said management device.

4. A communication system according to Claim 1, wherein:
said sixth means, when receiving said destination terminal information from said relay device, identifies a relay device linked to a mobile terminal to which said destination address indicated by said identification information is assigned; and requests said relay device to store in accordance with address binding information of said mobile terminal, address binding information of said packet sending mobile terminal; and

said relay device further comprises ninth means, when requested by said management device to store in accordance with said address binding information of said mobile terminal, address binding information of another mobile terminal sending a packet to said mobile terminal, for storing in said relay memory, said address binding information of said another mobile terminal in accordance with said address binding information of said mobile terminal.

5. An address management method comprising:
a first step of, in a network having a plurality of relay devices each of which is linked to mobile terminals, storing, with a management device having a management memory, in the management memory, address binding information indicating correspondence between static communication addresses uniquely pre-assigned to said mobile terminals and dynamic communication addresses assigned to said mobile terminals while located in communication areas covered by said

plurality of relay devices, and communication status information indicating communication partners of said mobile terminals;

a second step of acquiring and storing, with a first relay device having a relay memory, in said relay memory, address binding information indicating correspondence between a static communication address assigned to a first mobile terminal linked to said first relay device, and a dynamic communication address assigned to said first mobile terminal;

a third step of sending, with said first relay device, to said management device, destination terminal information indicating a destination address of a packet sent from said first mobile terminal;

a fourth step of, when receiving said destination terminal information from said first relay device, reading, with said management device, from said management memory a dynamic communication address corresponding to said destination address indicated by said destination terminal information, and sending to said first relay device, destination terminal information indicating said dynamic communication address;

a fifth step of receiving, with said first relay device, said destination terminal information replied from said management device, and storing as address binding information of a communication partner of said first mobile terminal, in association with said address binding information, address binding information indicating correspondence between said destination address and said dynamic communication address indicated by said received destination terminal information;

a sixth step of, when said first mobile terminal terminates communication, releasing, with said first relay device, in said relay memory a memory area storing said address binding information of said first mobile terminal and a memory area storing said address binding information of said communication partner associated with said address binding information of said first mobile terminal, and requesting said management device to delete said address binding information of said first mobile terminal;

a seventh step of, when requested by said first relay device to delete said address binding information of said first mobile terminal, identifying, with said management device, a second mobile terminal which is a communication partner of said first mobile terminal on the basis of said communication status information of said first mobile terminal stored in said management memory, identifying a second relay device linked to said second mobile terminal on the basis of address binding information of said second mobile terminal stored in said management memory, sending to said second relay device a request for deleting said address binding information of said second mobile terminal along with information for identifying said second mobile terminal, and releasing in said management memory a memory area storing said address binding information of said first mobile terminal and a memory area for storing said communication status information of said first mobile terminal; and

an eighth step of, when receiving said request and said information for identifying said second mobile terminal, releasing, with said second mobile terminal, a memory area storing said address binding information of said first mobile terminal associated with address binding information of said second mobile terminal.

6. An address management method according to Claim 5, wherein:
in said second step, said first relay device, when requested to initiate communication by said first mobile terminal located in a communication area covered by said first relay device, acquires said dynamic communication address of said first mobile terminal; links with said first mobile terminal by permitting said first mobile terminal to initiate communication; stores in said relay memory, said address binding information of said first mobile terminal indicating correspondence between said static communication address and said dynamic communication address; and sends to said management device said address binding information, to cause said management device to store said address binding information in accordance with information for identifying said first relay device; and

in said fourth step, said management device, when receiving said destination terminal information from said first relay device, stores in said management memory, communication status information indicating that a mobile terminal, to which said destination address indicated by said destination terminal information is assigned, and said first mobile terminal are communicating with each other.

7. A address management method according to Claim 5, wherein, in said fourth step, said management device, when said management memory does not store a dynamic communication address corresponding to said destination address indicated by said destination terminal information, identifies a relay device that can be linked to a mobile terminal to which said destination address is assigned; requests said relay device to acquire said dynamic communication address corresponding to said destination address of said mobile terminal; and stores in said management memory, in accordance with identification information identifying said relay device, address binding information indicating correspondence between said destination address and said dynamic communication address sent from said mobile terminal,

said address management method further comprising:

a ninth step of, when requested by said management device to acquire said dynamic communication address corresponding to said destination address indicated by said destination terminal information, requesting, with said relay device, said mobile terminal to initiate communication to which said destination address is assigned; linking with said mobile terminal by acquiring said dynamic communication address of said mobile terminal; storing in a relay memory of said relay device, address binding information indicating correspondence between said destination address and said dynamic communication address of said mobile terminal; and sending said address binding information to said management device.

8. An address management method according to Claim 5, wherein, in said fourth step, said management device, when receiving said destination terminal information from said first relay device, identifies a relay device linked to a mobile terminal to which said destination address indicated by said identification information is assigned; and requests said relay device to store in accordance with address binding information of said mobile terminal, said address binding information of said first mobile terminal,

said address management method further comprising:

a tenth step, when requested by said management device to store in accordance with said address binding information of said mobile terminal, said address binding information of said first mobile terminal, of storing in a relay memory of said relay device, said address binding information of said first mobile terminal in accordance with said address binding information of said mobile terminal.

9. A relay device which has a relay memory, and modifies and transfers packets sent from mobile terminals linked to said relay device on the basis of content stored in the relay memory, said relay device comprising:

first means for acquiring and storing in said relay memory, address binding information indicating correspondence between a static communication address uniquely pre-assigned to a mobile terminal linked to said relay device and a dynamic communication address assigned to said mobile terminal while located in a communication area covered by said relay device;

second means for sending to a management device having a management memory, destination terminal information indicating a destination address of a packet sent from said mobile terminal, for receiving destination terminal information replied from said management device, and for storing as address binding information of a communication partner of said mobile terminal, in association with address binding information of said mobile terminal, address binding information indicating correspondence between said destination address

and a dynamic communication address indicated by said received destination terminal information;

third means, when said mobile terminal terminates communication, for releasing in said relay memory a memory area storing said address binding information of said mobile terminal and a memory area storing said address binding information of said communication partner associated with said address binding information of said mobile terminal, and for requesting said management device to delete said address binding information of said mobile terminal; and

fourth means, when requested by said management device to delete address binding information of another mobile terminal which is linked to another relay device and terminates communication, for releasing in said relay memory a memory area storing said address binding information of said another mobile terminal associated with said address binding information of said mobile terminal.

10. A relay device according to Claim 9, wherein

said first means, when requested to initiate communication by said mobile terminal located in a communication area covered by said relay device, acquires said dynamic communication address of said mobile terminal; links said relay device with said mobile terminal by permitting said mobile terminal to initiate communication; stores in said relay memory, said address binding information of said mobile terminal indicating correspondence between said static communication address and said dynamic communication address; and sends said address binding information to said management device.

11. A relay device according to Claim 9, further comprising:

fifth means, when requested by said management device to acquire a dynamic communication address corresponding to a destination address indicated by destination terminal information, for requesting a mobile terminal to initiate communication to which said destination address is assigned; for linking said relay device with said mobile terminal by acquiring a dynamic communication address of said mobile terminal; for storing in said relay memory,

address binding information indicating correspondence between said destination address and said dynamic communication address of said mobile terminal; and for sending said address binding information to said management device.

12. A relay device according to Claim 9, further comprising:

sixth means, when requested by said management device to store in accordance with said address binding information of said mobile terminal, address binding information of another mobile terminal sending to a packet to said mobile terminal, for storing in said relay memory, said address binding information of said another mobile terminal in accordance with said address binding information of said mobile terminal.

13. A management device having a management memory, comprising:

first means, in a network having a plurality of relay devices each of which is linked to mobile terminals, for storing in the management memory, address binding information indicating correspondence between static communication addresses uniquely pre-assigned to said mobile terminals and dynamic communication addresses assigned to said mobile terminals while located in communication areas covered by said plurality of relay devices, and communication status information indicating communication partners of said mobile terminals;

second means, when receiving from a relay device, destination terminal information of a packet sent from a mobile terminal linked to said relay device, for reading from said management memory, a dynamic communication address corresponding to a destination address indicated by said destination terminal information, and for sending to said relay device, destination terminal information indicating said dynamic communication address; and

third means, when requested by a relay device to delete address binding information of a mobile terminal which terminates communication, for identifying a communication partner of said mobile terminal on the basis of communication status information of said mobile terminal stored in said

management memory, for identifying a relay device linked to said communication partner on the basis of address binding information of said communication partner stored in said management memory, for requesting said relay device to delete said address binding information of said communication terminating mobile terminal, and for releasing in said management memory a memory area storing said address binding information of said communication terminating mobile terminal and a memory area for storing said communication status information of said communication terminating mobile terminal.

14. A management device according to Claim 13, wherein:

said first means, when receiving said address binding information of said mobile terminals from said plurality of relay devices, stores in said management memory, said address binding information in accordance with identification information specifying said plurality of relay devices which have sent said address binding information; and

said second means, when receiving said destination terminal information from said relay device, stores in said management memory, communication status information indicating that a mobile terminal, to which is assigned said destination address indicated by said destination terminal information, and said packet sending mobile terminal are communicating with each other.

15. A management device according to Claim 13, wherein

said second means, when said management memory does not store a dynamic communication address corresponding to said destination address indicated by said destination terminal information, identifies a relay device that can be linked to a mobile terminal to which said destination address is assigned; requests said relay device to acquire a dynamic communication address corresponding to said destination address of said mobile terminal; and stores in said management memory, in accordance with identification information specifying said relay device, address binding information indicating

correspondence between said destination address and said dynamic communication address sent from said mobile terminal.

16. A management device according to Claim 13, wherein said second means, when receiving said destination terminal information from said relay device, identifies a relay device linked to a mobile terminal to which said destination address indicated by said identification information is assigned; and requests said relay device to store in accordance with address binding information of said mobile terminal, address binding information of said packet sending mobile terminal.